

Results. The prevalence of microvascular dysfunction as defined by a CFVR \leq 0.75 and a FFR $>$ 0.75 was 46% after recanalization, but decreased to 26% at follow-up. The major determinant of microvascular dysfunction at baseline was the presence of diabetes mellitus but not LV function. The improvement of CFVR during follow-up was due to a decrease in basal average peak velocity from 30.7 \pm 14.9 cm/s to 25.5 \pm 13.3 cm/s (p=0.001), and it was less pronounced in diabetic patients. An improvement of the regional LV function, measured as an increase of the regional wall motion severity index >1 SD/chord, was observed in 41% of patients. This improvement was not impaired by the presence of microvascular dysfunction immediately after recanalization. The improvement in LV function was correlated with the increase in CFVR (r=0.38; p=0.002). At follow-up diabetes mellitus remained the major determinant of a persistent microvascular dysfunction.

Conclusions. The frequently observed microvascular dysfunction after recanalization of a CTO is a transient phenomenon in most patients, and mainly associated with the presence of diabetes mellitus. Microvascular dysfunction after recanalization does not impede the recovery of LV function, which improves parallel to an increase of CFVR.

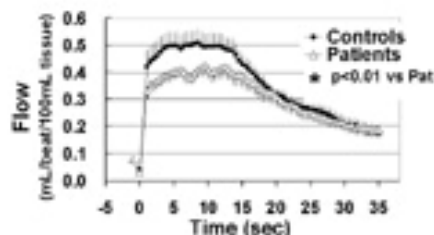
1065-169 Measurement of Endothelial Dysfunction With an Observer-Independent Magnetic Resonance Approach

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Background: Endothelial dysfunction is recognized as an early event in atherogenesis. Accurate and reproducible measurements of endothelial function would be highly desirable. **Aim:** To develop a real-time MR flow technique (rt-MR) for monitoring ischemia-induced hyperemic flow (hF) in the femoral artery. **Methods:** 17 patients (49 \pm 6 years) with 1.9 \pm 1.1 ATPIII risk factors but without stenoses in the femoral arteries and 13 age-matched healthy volunteers were studied with rt-MR with a spatial/temporal resolution of 1x1mm²/48ms, respectively. For reference a conventional retrospectively-gated MR (refMR) was acquired over 6 minutes (spatial/temporal resolution 0.7x0.7mm²/22ms). Following 6 resting measurements, hF was measured following cuff release after 4 min. of occlusion. At a mean of 9 \pm 12 days the entire protocol was repeated in 24 subjects (12 volunteers, 12 patients). **Results:** Agreement between flow with rt-MR/refMR was -2.5 \pm 14.5% (mean difference \pm SD). Reproducibility of fully automatic vessel area and flow measurements was -0.6 \pm 1.54% and 7.1 \pm 10.2% (mean \pm SD), respectively. hF in patients was reduced vs controls (Figure) and correlated inversely with the number of risk factors (r=-0.46, p<0.011). Minimal vascular resistance after release correlated with Framingham and Procarn risk categories.

Conclusions

This rt-MR technique measures hyperemic response with high reproducibility and demonstrates flow impairment in small patient populations in accordance with their risk profile.



1065-170 Myocardial Bridging Is Associated With Impairment in Endothelium-Dependent Vasorelaxation

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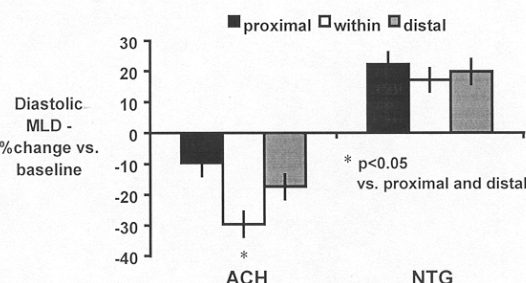
Background - Blood flow-related shear stress has been recognized as an important factor for endothelial function. MB is a congenital condition of blood flow alteration; however if it is also associated with endothelial function alteration remains to be determined.

Methods - Case-control designed study with 29 patients with MB and 58 patients without MB. Endothelium-dependent and endothelium-independent vasorelaxation were determined by the percent change in diastolic minimal lumen coronary artery diameter after intracoronary infusion of acetylcholine (ACH, 10-6 to 10-4 mol/L) and intracoronary injection of nitroglycerin (NTG, 200 mg), respectively. Coronary flow velocity reserve (CFVR) was determined after intracoronary injection of adenosine (18 to 36 mg).

Results - In response to ACH, there was significantly more vasoconstriction at the MB site compared with the segment proximal and distal to it (see figure) and compared with the mid-LAD segment in the control group (-29.6 \pm 21.7 vs. -5.9 \pm 36.5%, p<0.001). The response to NTG was similar among all three MB-related sites and between case and control group. CFVR was the same in case and control group (3.2 \pm 0.8 vs. 3.2 \pm 0.9, p=1).

Conclusions - MB is characterized by impairment in endothelium-dependent vasorelaxation. These functional alterations may add to the severity of structural lumen compression

and thus to the clinical presentation of this congenital abnormality.



1065-171 Vascular Compliance Versus Endothelial Function: Which Correlates Better to Risk Factor Score?

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Background: The intensity of exposure to risk factors is predictive of vascular dysfunction as shown by measures of vascular compliance or endothelium dependent vasodilation. However, the two measures have not been compared directly. In this study we examine the correlation of endothelium dependent vasodilation or vascular compliance to the intensity of risk factor exposure, in the same individuals.

Methods: The study included 100 patients with a minimum of one cardiovascular risk factor (59 men; 54-87 years, 41 women (55-85 yrs)). The intensity of risk factor exposure was determined using the quantitative assessment promulgated by the AHA/ACC (Celer-major DS, Sorensen KE, Bull C, Robinson J, Deanfield JE. Endothelium-dependent dilation in systemic arteries of asymptomatic subjects relates to coronary risk factors and their interaction. J Am Coll Cardiol. 1994 Nov 15;24(6):1468-74). Compliance of large (C1) and small (C2) arteries was assessed by pulse waveform analysis using the HDI CVProfil. Flow mediated vasodilation (FMVD) of the brachial artery was evaluated using Siemens Acuson Sequoia C256 high resolution ultrasound to measure arterial diameter at rest and status post reactive hyperemia.

Results: C1 arterial elasticity ranged from 4.9-25.7 ml/mmHg X 10 and C2 arterial elasticity from .93-11.17 ml/mmHg X 10². Flow-mediated vasodilation (FMVD) ranged from -8.1% to 20.5% change. C1 and C2 showed a strong association with coronary risk factors. This correlation was statistically significant with r=-.440, p= <.001 for C1, and r=-.267, p=.007 for C2. Correlation between FMVD and AHA risk factors did not reach statistical significance (r=-0.085, p=0.399).

Conclusions: Vascular compliance as assessed by pulse waveform analysis correlated better with the intensity of exposure to cardiovascular risk factors than did endothelium dependent vasodilation as assessed by high resolution ultrasound. This may be due to the fact that the pulse waveform analysis is less operator dependent, or perhaps that it is a more sensitive integration of the alterations in endothelial and vascular smooth muscle that occur with exposure to risk factors.

1065-172 The Role of a Family History of Diabetes on Endothelial Function

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Background: Vascular disease is the leading cause of morbidity and mortality in patients with diabetes. However, the impact of a family history of diabetes on endothelial function remains incompletely understood.

Methods: To determine the impact of a family history (FH) of diabetes on endothelial function, we evaluated 37 nondiabetic healthy subjects who had either both parents with type 2 diabetes (FH+, n=18), or no first-degree relative with diabetes (FH-, n=19). Glucose and insulin levels were measured before and during a 2 hour oral glucose tolerance test. Vascular ultrasonography was used to image the brachial artery and measure flow-mediated endothelium-dependent vasodilation (EDV) and nitroglycerin-induced (0.4 mg) endothelium-independent vasodilation (EIV).

Results: Groups were not significantly different for age, gender, ethnicity, BMI, total cholesterol, triglyceride, HDL, systolic or diastolic blood pressure (BP), fasting insulin, 2 hr insulin, or homeostasis model assessment (HOMA) derived insulin resistance (all p=ns). Fasting glucose was higher in FH+ than FH- (94.8 \pm 11.0 vs 87.5 \pm 8.2 mg/dl, respectively, p<0.03); however there was no significant difference between groups in 2 hr glucose, area under the curve glucose, or HbA1c. EDV was lower in the FH+ than FH- group (7.2 \pm 4.2% vs 11.6 \pm 7.3%, p=0.03), but there was no difference between groups in EIV (18.3 \pm 7.4 vs 19.3 \pm 5.6%, p=0.7). In the combined cohort, only FH status (p=0.03) and HbA1c correlated inversely with EDV (r²=0.12, p=0.05). In the FH- group, HbA1c (r²=0.27, p<0.03), cholesterol (r²=0.36, p=0.009), and SBP (r²=0.27, p<0.03) were each negatively correlated with EDV, whereas in the FH+ group only HDL was positively associated (r²=0.32, p<0.02). In multiple regression analysis including the variables FH status, HbA1c, cholesterol, HDL and SBP, only FH remained a significant determinant of EDV.

Conclusions: These data suggest that the bioavailability of nitric oxide is lower in persons with a strong family history of diabetes, and may contribute to cardiovascular risk in advance of development of overt diabetes.